REMARKS

Applicant respectfully requests entry of the amendments herein prior to examination. Claims 1-43 are presently pending. Claims 1, 12-15, 17-20, 22, 24, 25, 33, 36, 37, 40, and 41 are amended. No new claims are added.

The Applicant expressly grants permission to the Office to interpret all pending claims of this application.

Herein, the "Action" or "Office Action" refers to the Office Action dated August 26, 2002.

Allowable Subject Matter

Applicant appreciates the Office's acknowledgement that claims 2, 3, 5-11, 27-32, 35, 36, and 43 are allowable as is.

Applicant also appreciates the Office's statement that claims 24, 40, and 41 would be allowable if rewritten in independent form. Accordingly, Applicant amends claims 24, 40, and 41 to place them into independent form. These amendments do not narrow or broaden the scope of these claims since they merely move the text of the base claims into the body of the formerly dependent claims.

Prior Art Status of References

Applicant does not explicitly or implicitly admit that any reference is prior art. Nothing in this communication should be considered an acknowledgement, acceptance, or admission that any reference is considered prior art.

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Suggested Amendment to claim 37

Applicant appreciates the Examiner's suggested amendment to claim 37. Specifically, the Office recommends that "of" in the 4th line of claim 37 be removed to correct an apparent grammatically error. Applicant amends claim 37 accordingly.

In addition, Applicant amends claim 37 to remove the second "of" in the 5th line of claim 27. This amendment is in the same spirit as the amendment suggested by the Examiner.

Traversal of Official Notices

In this Office Action, the Office rejects claims 15, 19 and 20, at least in part, by taking Official Notice.

In a response to a prior Office Action, Applicant requested that the Office provide one or more affidavits setting forth the details of person knowledge of the Official Notice. Applicant indicated that the Examiner is required to provide such an affidavit, when requested, under 37 C.F.R. §1.104(d)(2).

In the Action, the Examiner indicates that this patent rule is only applicable to situations where the Official Notice is based upon the personal knowledge of the Examiner. The Examiner indicates that 37 C.F.R. §1.104(d)(2) is not applicable in this situation because the Official Notice is based upon what is known to those of ordinary skill in the art, rather than based upon the Examiner's personal knowledge.

If the Examiner is, indeed, not relying upon his own personal knowledge, then Applicant withdraws its request for an affidavit under 37 C.F.R. §1.104(d)(2). However, Applicant's traversal of the Official Notice remains. If facts are well-

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known to those of ordinary skill in the art, then Applicant asks the Office to cite one or more references to support that assertion.

Substantive Claim Rejections

Claim Rejections under §102 and §103

The Office rejects all pending claims under §102 and §103. For the reasons set forth below, the Office has not made out a *prima facie* case of anticipation (i.e., §102). Likewise, for the reasons set forth below, the Office has not made out a *prima facie* case of obviousness (i.e., §103). Accordingly, Applicant respectfully requests that the rejections be withdrawn and the case be passed along to issuance.

The Office's rejections are based upon one or more of the following references (in combination or alone):

- **Mintzer**: *Mintzer et al.*, "If One Watermark is Good, Are More Better?", Acoustic, Speech, and Signal Processing, vol. 4, pp. 2067-2069, 1999;
- **Linnartz**: *Linnartz*, US Patent No. 5,933,798; and
- **Levine:** *Levine et al.*, US Patent No. 6,209,094.

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Anticipation Rejections

Claims 1, 4, 22, 26, 33, 34, and 27

The Office rejects claims 1, 4, 22, 26, 33, 34, and 27 under 35 USC §102(a) as being clearly anticipated by Mintzer.

In his "Response to Arguments" on page 2 of the Action, the Examiner notes that Mintzer must inherently have selective logic to make the decision regarding the order in which the robust and fragile watermarks are inserted.

For the reasons given below, Applicant submits that Mintzer does not disclose every element of these claims. Accordingly, Mintzer does not anticipate these claims. Applicant asks that the Office withdraw this rejection.

Claim 1

To clarify, Applicant amends the second element of this claim so that it now recites, "a watermark insertion unit configured to selectively ~~choose insertion of~~ insert either the strong watermark or the weak watermark into segments of the audio signal, so that resulting segments have either the strong or the weak watermark inserted therein, but not both."

In contrast to the watermark insertion unit of this claim, Mintzer inserts multiple watermarks into the same segments of its signal.

Therefore, Mintzer does not disclose every element of this claim. Accordingly, Mintzer does not anticipate this claim. Applicant asks that the Office withdraw this rejection.

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Claim 4

This claim is dependent upon claim 1. So, in addition to its own independent merits, it is allowable for, at least, same reasons given above in the discussion of claim 1.

Therefore, Mintzer does not disclose every element of this claim. Accordingly, Mintzer does not anticipate this claim. Applicant asks that the Office withdraw this rejection.

Claims 22 and 33

To clarify, Applicant amends these claims so that they now recite, "that resulting segments have either the strong or the weak watermark inserted therein, but not both."

In contrast to this claim, Mintzer inserts multiple watermarks into the same segments of its signal.

Therefore, Mintzer does not disclose every element of these claims. Accordingly, Mintzer does not anticipate these claims. Applicant asks that the Office withdraw this rejection.

Claims 26, 34, and 37

Applicant does not amend claims 26 and 34 herein. Applicant's amendment of claim 37 is to change "distinguishable" to "separate."

These claims already recite, "the first and second portions are separate" where the first portion has the strong watermark and second portion has the weak watermark.

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In contrast to these claims, Mintzer inserts multiple watermarks into the same portions of its signal. Therefore, the first and second portions of Mintzer are not separate.

Therefore, Mintzer does not disclose every element of these claims. Accordingly, Mintzer does not anticipate these claims. Applicant asks that the Office withdraw this rejection.

Claims 12-14 and 16

The Office rejects these claims under 35 USC §102(e) as being clearly anticipated by Linnartz. Applicant expressly reserves the right to file a §131 declaration with respect to Linnartz.

For the reason given below, Applicant submits that Linnartz does not disclose every element of these claims. Accordingly, Linnartz does not anticipate these claims. Applicant asks that the Office withdraw this rejection.

Claim 12

In his "Response to Arguments" on page 3 of the Action, the Examiner notes that claim 12 does not mandate the inclusion of multiple watermarks. The Examiner says that since Linnartz discloses the presence of one watermark the limitations of claim 12 are met.

To clarify, Applicant amends this claim so that the correlation module is configured to "detect whether a watermark is present" and, if so, "determine that watermark is either a strong watermark or a weak watermark."

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In contrast to this claim, Linnartz can only detect one type of watermark; therefore, it makes no determination about what type it is. Furthermore, Applicant maintains that Linnartz does not disclose a synchronization module.

Therefore, Linnartz does not disclose every element of this claim. Accordingly, Linnartz does not anticipate this claim. Applicant asks that the Office withdraw this rejection.

Claims 13, 14 and 16

This claim is dependent upon claim 12. So, in addition to its own independent merits, it is allowable for, at least, same reasons given above in the discussion of claim 12.

Therefore, Linnartz does not disclose every element of this claim. Accordingly, Linnartz does not anticipate this claim. Applicant asks that the Office withdraw this rejection.

Obviousness Rejections

The Office Has Not Made Out a Case of Prima Facie Obviousness

Applicant disagrees with the Office's obviousness rejections and respectfully submits that the Office has not made out a *prima facie* case of obviousness. Accordingly, Applicant respectfully requests withdrawal of these rejections.

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Claims 38, 39, and 42

The Office rejects these claims under 35 USC §103(a) as being unpatentable over Mintzer in view of Levine.

All of these claims depend upon claim 37. As indicated above, claim 37 is allowable. Therefore, in addition to their own merits, these claims are allowable because their base claim is allowable.

Furthermore, Levine is not concerned with multiple disparate watermarks. Rather, it is focused on increasing the robustness of a watermark in an audio signal and thereby making it more difficult to attack. Therefore, Levine's discussion (in lines 45-51 of col. 5) about audible range of the human listener is emphasizing the benefits of embedding watermarks in the audible range to enhance their robustness.

Mintzer is about layering multiple marks, but no distinction is made as to where. Levine is about inserting a single mark in a particular portion of a signal. Combining to two produces a system that layers multiple watermarks in a particular portion of a signal. That is not what these claims cover.

Applicant submits that Mintzer and Levine reveal no motivation to combine their teachings. Furthermore, the combination of these teachings does not result in what is recited by this claim. Accordingly, these claims are not obvious for the above reasons. Applicant asks that the Office withdraw this rejection.

Claims 17, 18, 21, and 25

The Office rejects these claims under 35 USC §103(a) as being unpatentable over Linnartz in view of Mintzer and Levine.

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Linnartz is focused on single watermarks while Mintzer provides no implementation details on how to embed or detect multiple watermarks. These claims recite "a watermark detector configured to detect whether a watermark is present in a portion of the watermarked audio signal and, if a watermark is detected, further configured to determine whether that watermark is either a strong or a weak watermark."

There is no motivation to combine the teachings of any of these references. Furthermore, the combination of these teachings does not result in what is claimed by these claims. Accordingly, these claims are not obvious for the above reasons. Applicant asks that the Office withdraw this rejection.

Claim 20

The Office rejects this claim under 35 USC §103(a) as being unpatentable over Linnartz, Mintzer, and Levine as applied to the Office's reasoning for rejecting claim 17.

This claim is dependent upon claim 17. So, in addition to its own independent merits, it is allowable for, at least, same reasons given above in the discussion of claim 17.

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Claim 23

The Office rejects this claim under 35 USC §103(a) as being unpatentable over Mintzer in view of Linnartz. In addition to other reasons, this claim is allowable because its base claim (claim 22) is allowable.

Claims 15 and 19

The Office rejects these claims under 35 USC §103(a) as being unpatentable over Mintzer, Levine, and Adler as applied to the Office's reasoning for rejecting claims 12, 17, and 27.

Although the Office acknowledges that neither reference discloses that "the correlation value must be exceeded by a random number," the Office takes Official Notice of such. As indicated above, Applicant traverses this Official Notice.

In addition to other reasons, these claims are allowable because their base claims are allowable.

Dependent Claims

In addition to other possible reasons, each dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each dependent claim where its base claim is allowable.

Claim Amendments

All of the claim amendments are done to make the claim language more readable, linguistically clearer, and/or grammatically correct. None of the

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amendments is done to meet any statutory requirement. None narrows the scope of the claims.

All of the amended claims (1, 12-15, 17-20, 22, 24, 25, 33, 36, 37, 40, and 41) were amended for other similar reasons.

Conclusion

All pending claims are in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the application. If any issues remain that prevent issuance of this application, the Office is urged to contact the undersigned attorney before issuing a subsequent Action.

Respectfully Submitted,

Dated: 10-16-02 By: _____

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Amended Claims (and the non-amended pending claims)

(in *Marked-up* Form, in accordance with 37 CFR §1.121):

Please amend claims 1, 12-15, 17-20, 22, 24, 25, 33, 36, 37, 40, and 41 as indicated below:

1. **(THRICE AMENDED)** An audio watermarking system comprising

a pattern generator configured to generate both a strong watermark and a weak watermark; and

a watermark insertion unit configured to selectively ~~choose insertion of~~ insert either the strong watermark or the weak watermark into segments of the audio signal, so that resulting segments have either the strong or the weak watermark inserted therein, but not both.

2. **(PREVIOUSLY TWICE AMENDED)** An audio watermarking system comprising:

a pattern generator to generate both a strong watermark and a weak watermark; and

a watermark insertion unit to insert the strong watermark and the weak watermark into the audio signal,

wherein the watermark insertion unit selectively inserts either the strong watermark or the weak watermark into segments of the signal according to an audible measure of the segments.

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3. (PREVIOUSLY TWICE AMENDED) An audio watermarking system comprising:

a pattern generator to generate both a strong watermark and a weak watermark;

a watermark insertion unit to insert the strong watermark and the weak watermark into the audio signal;

a processor to determine a hearing threshold for the audio signal; and

the watermark insertion unit inserts the strong watermark when the signal exceeds the hearing threshold and inserts the weak watermark when the signal falls below the hearing threshold.

4. An operating system comprising an audio watermarking system as recited in claim 1.

5. (PREVIOUSLY AMENDED) An audio watermark encoding system comprising:

a converter to convert an audio signal into magnitude and phase components;

a mask processor to determine a hearing threshold for corresponding magnitude components;

a pattern generator to generate both a strong watermark and a weak watermark; and

a watermark insertion unit to selectively insert one of either the strong watermark or the weak watermark into the audio signal based on whether the magnitude components exceed or fall below the hearing threshold.

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6. An audio watermark encoding system as recited in claim 5, wherein the watermark insertion unit inserts the strong watermark when the magnitude component exceeds the hearing threshold and inserts the weak watermark when the magnitude component falls below the hearing threshold.

7. An audio watermark encoding system as recited in claim 5, wherein the watermark insertion unit inserts the strong watermark when the magnitude component exceeds the hearing threshold by a predetermined amount and inserts the weak watermark when the magnitude component falls below the hearing threshold by the predetermined amount.

8. An audio watermark encoding system as recited in claim 7, wherein the watermark insertion unit foregoes inserting the strong watermark or the weak watermark when the magnitude component lies within the predetermined amount above and below the hearing threshold.

9. An audio encoding system comprising:

an audio watermark encoding system as recited in claim 5; and

a compression unit, wherein the compression unit and the audio watermark encoding system both utilize the magnitude components.

10. An operating system comprising an audio watermark encoding system as recited in claim 5.

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11. (PREVIOUSLY TWICE AMENDED) A watermark insertion unit, comprising:

an input to receive frequency magnitude components of an audio signal, hearing thresholds derived from the magnitude components, strong watermark values, and weak watermark values; and

multiple insertion operators for selectively combining the magnitude components and one of either the strong watermark values or the weak watermark values depending upon whether the magnitude components exceed or fall below the hearing thresholds.

12. (TWICE AMENDED) An audio watermark detection system, comprising:

an input module configured to receive a watermarked audio signal;

a synchronization module configured to determine which portion of the watermarked audio signal might contain a watermark; and

a correlation module configured to detect whether a watermark is present in the portion of the watermarked audio signal that the synchronization module determines might contain a watermark and, if a watermark is detected, further configured to determine whether that watermark is either a strong watermark or a weak watermark ~~is present in the portion of the watermarked audio signal~~.

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13. (AMENDED) An audio watermark detection system as recited in claim 12, wherein the correlation module is further configured to computes a correlation value from the watermarked audio signal and the strong watermark that tends toward a first value when the strong watermark is present and a second value when the strong watermark is not present.

14. (AMENDED) An audio watermark detection system as recited in claim 12, wherein the correlation module is further configured to computes a correlation value from the watermarked audio signal and the weak watermark that tends toward a first value when the weak watermark is present and a second value when the weak watermark is not present.

15. (TWICE AMENDED) An audio watermark detection system as recited in claim 12, wherein the correlation module is further configured to computes a correlation value from the watermarked audio signal and one of either the strong watermark or the weak watermark, the correlation module determining that said one strong watermark or weak watermark is present when the correlation value exceeds a predetermined threshold plus a random amount.

16. An operating system comprising an audio watermark detection system as recited in claim 12.

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17. (AMENDED) An audio watermark detection system comprising:

~~a converter to convert a watermarked audio signal into magnitude and phase components;~~

~~a mask processor to determine a hearing threshold for corresponding magnitude components;~~

a pattern generator configured to generate both a strong watermark and a weak watermark; and

a watermark detector configured to detect ~~presence of the strong watermark and the weak watermark in the audio signal~~ whether a watermark is present in a portion of the watermarked audio signal and, if a watermark is detected, further configured to determine whether that watermark is either a strong or a weak watermark.

18. (AMENDED) An audio watermark detection system as recited in claim 17, wherein the watermark detector is further configured to computes correlation values from the watermarked audio signal and each of the strong watermark and the weak watermark and ~~detects the presence of~~ to determine whether that watermark is either the strong watermark ~~and~~ or the weak watermark based on whether the correlation values exceed a predetermined threshold.

19. (AMENDED) An audio watermark detection system as recited in claim 17, further comprising:

a random operator for generating a random value; and

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the watermark detector being further configured to computes correlation values from the watermarked audio signal and each of the strong watermark and the weak watermark and ~~detects the presence of~~ to determine whether that watermark is either the strong watermark ~~and~~ or the weak watermark based on whether the correlation values exceed a predetermined threshold plus the random value.

20. (AMENDED) An audio decoding system comprising:

an audio watermark detection system as recited in claim 17;

a converter configured to convert a watermarked audio signal into magnitude and phase components;

a mask processor configured to determine a hearing threshold for corresponding magnitude components; and

a decompression unit, wherein the decompression unit and the audio watermark detection system both utilize the magnitude components.

21. An operating system comprising an audio watermark detection system as recited in claim 17.

22. (THRICE AMENDED) An audio watermarking architecture, comprising:

a watermark encoding system configured to selectively ~~choose insertion of~~ insert either a strong watermark or a weak watermark into segments of an audio signal, so that resulting segments have either the strong or the weak watermark inserted therein, but not both; and

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a watermark detecting system configured to detect a presence of a watermark in the segments of the audio signal and, if a watermark is present, further configured to determine whether the present watermark is ~~of~~ either the strong watermark or the weak watermark ~~in the segments of the audio signal~~.

23. An audio watermarking architecture as recited in claim 22, wherein the watermark encoding system resides at a content producer to watermark original audio content and the watermark detecting system resides at one or more clients to detect the watermarks and play the original audio content.

24. (TWICE AMENDED) An audio watermarking architecture ~~as recited in claim 22,~~ comprising:

a watermark encoding system configured to selectively insert either a strong watermark or a weak watermark into segments of an audio signal; and

a watermark detecting system configured to detect a presence of either the strong watermark or the weak watermark in the segments of the audio signal

wherein the watermark encoding system comprises:

a converter configured to convert the audio signal into magnitude and phase components;

a mask processor configured to determine a hearing threshold for corresponding magnitude components;

a pattern generator configured to generate both the strong watermark and the weak watermark; and

a watermark configured insertion unit to selectively insert one of either the strong watermark or the weak watermark into the audio signal

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based on whether the magnitude components exceed or fall below the hearing threshold.

25. (AMENDED) An audio watermarking architecture as recited in claim 22, wherein the watermark detecting system comprises:

a converter configured to convert a watermarked audio signal into magnitude and phase components;

a mask processor configured to determine a hearing threshold for corresponding magnitude components;

a pattern generator configured to generate both a strong watermark and a weak watermark; and

a watermark detector configured to detect ~~presence of the strong watermark and the weak watermark in the audio signal~~ whether a watermark is present in a portion of the watermarked audio signal and, if a watermark is detected, further configured to determine whether that watermark is either the strong or the weak watermark.

26. (PREVIOUSLY TWICE AMENDED) A method for watermarking an audio signal, comprising:

watermarking a first portion of the audio signal with a strong watermark; and

watermarking a second portion of the audio signal with a weak watermark, wherein the first and second portions are separate.

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27. A method for watermarking an audio signal, comprising:

comparing samples of the audio signal to a hearing threshold;

watermarking samples exceeding the hearing threshold with a strong watermark; and

watermarking samples falling below the hearing threshold with a weak watermark.

28. A method as recited in claim 27, wherein the watermarking samples comprises:

watermarking samples exceeding the hearing threshold plus a buffer value with a strong watermark;

watermarking samples falling below the hearing threshold by less than the buffer value a with a weak watermark; and

leaving samples lying within the buffer value above and below the hearing threshold without a watermark.

29. A method as recited in claim 27, further comprising detecting the strong watermark and the weak watermark in the audio signal.

30. A method as recited in claim 29, wherein the detecting comprises computing a correlation value from the audio signal and the strong watermark, the correlation value tending toward a first value when the strong watermark is present and a second value when the strong watermark is not present.

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31. A method as recited in claim 29, wherein the detecting comprises computing a correlation value from the audio signal and the weak watermark, the correlation value tending toward a first value when the weak watermark is present and a second value when the weak watermark is not present.

32. A method as recited in claim 27, further comprising:

computing a correlation value from the audio signal and one of the strong watermark or the weak watermark; and

determining that said one strong watermark or weak watermark is present when the correlation value exceeds a predetermined threshold plus a random amount.

33. **(THRICE AMENDED)** A method comprising:

selectively encoding portions of an audio signal with either a strong watermark or a weak watermark, so that resulting portions have either the strong or the weak watermark encoded therein, but not both; and

detecting a presence of a watermark in the portions of the audio signal;

if a watermark is present, determining whether the present watermark is ~~of~~ either the strong watermark or the weak watermark ~~in the audio signal~~.

34. **(PREVIOUSLY TWICE AMENDED)** A computer readable medium having computer executable instructions for:

watermarking a first portion of an audio signal with a strong watermark; and

watermarking a second portion of the audio signal with a weak watermark,

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wherein the first and second portions are separate.

35. A computer readable medium having computer executable instructions for:

comparing samples of an audio signal to a hearing threshold;

watermarking samples exceeding the hearing threshold with a strong watermark; and

watermarking samples falling below the hearing threshold with a weak watermark.

36. (TWICE AMENDED) An audio watermarking system comprising:

a pattern generator to generate both a strong watermark and a weak watermark; and

a watermark insertion unit to insert the strong watermark and the weak watermark into the audio signal,

wherein the watermark insertion unit selectively ~~choose insertion of~~ inserts either the strong watermark or the weak watermark into segments of the signal according to an audible measure of the segments.

37. (AMENDED) An audio watermarking system comprising

a pattern generator configured to generate both a strong watermark and a weak watermark; and

a watermark insertion unit configured to insert ~~of~~ the strong watermark into one or more first segments of the audio signal and to insert ~~of~~ the weak watermark

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into one or more second segments of the audio signal, wherein the first and second segments are ~~distinguishable~~ separate.

38. An audio watermarking system as recited in claim 37, wherein the watermark insertion unit selectively chooses segments for insertion of the watermarks according to an audible measure of the segments.

39. An audio watermarking system as recited in claim 37, wherein the watermark insertion unit selectively chooses segments for insertion of the strong watermark according to an audible measure of the segments.

40. (AMENDED) An audio watermarking system ~~as recited in claim 37,~~ comprising:

a pattern generator configured to generate both a strong watermark and a weak watermark; and

a watermark insertion unit configured to insert the strong watermark into one or more first segments of the audio signal and to insert the weak watermark into one or more second segments of the audio signal, wherein the first and second segments are separate, wherein the watermark insertion unit selectively chooses segments for insertion of the weak watermark according to an audible measure of the segments.

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41. (TWICE AMENDED) An audio watermarking system ~~as recited in claim 37, further~~ comprising:

a pattern generator configured to generate both a strong watermark and a weak watermark; and

a watermark insertion unit configured to insert the strong watermark into one or more first segments of the audio signal and to insert the weak watermark into one or more second segments of the audio signal, wherein the first and second segments are separate;

a processor configured to determine a hearing threshold for segments of the audio signal; and

the watermark insertion unit being further configured to inserts the strong watermark into a segment when the signal of that segment exceeds the hearing threshold and inserts the weak watermark into a segment when the signal of that segment falls below the hearing threshold.

42. An operating system comprising an audio watermarking system as recited in claim 37.

43. A method as recited in claim 27, further comprising:

computing a correlation value from the audio signal and one of either the strong watermark or the weak watermark; and

determining that either said one strong watermark or said one weak watermark is present when the correlation value exceeds a predetermined threshold plus a random amount.

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